THE MOTOR AGE

THE AUTOMOBILE AUTHORITY OF AMERICA

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AS SEEN BY A STRANGER

AUTOMOBILISM IN NEW YORK AS IT IMPRESSED A CHICAGOAN—HOW THE DIFFERENCE IN THE CONDITION OF STREETS AFFECTS THE POPULARITY OF THE DIFFERENT TYPES OF VEHICLES—THE AMERICAN BICYCLE CO.'S ELECTRIC BRAKE DESCRIBED

BY M. C. KRARUP

New York, Sept. 3.—One might almost wish that Chicago and not New York were the center of the motor vehicle industry; for the wretched pavements of the western metropolis present a testing ground for reliable construction which must here be produced by artificial means. Many of the readers of The Motor Age who obtain their information of the automobile movement chiefly through these pages, undoubtedly do not realize to what extent the uniformly smooth streets of this city and adjacent boroughs, encourage the use of automobiles, which, in other places, might be found less staunch than desirable.

To the casual observer of the traffic in this city, it must seem very plain that both the electric and the steam vehicles are accepted as highly satisfactory means for urban locomotion. The electric vehicle, in a number of different styles, and the familiar little steam Locomobile, which, in the way of manufacture, is a

big year ahead of all its competitors, are seen everywhere cavorting with an impudent self-assurance at turns and crossings, that speaks volumes for their reliability as to management, so long as they are well taken care of in the stable. It must be a revelation to those whom familiarity with the sight has not rendered callous, to see the quick response to the slightest movement of the speed lever with which the little Locomobile darts forward from out a bunch of comparatively clumsy horse-drawn wagons, whenever an opening in the traffic presents a chance for a spurt, and then relapses as obediently into a sedate crawl when the opportunity has been spent.

Captivating Alertness

Mechanically, this captivating alertness tells the story of a power unit of minimum weight; of light construction which interposes no great inert mass between the driver and the instantaneous realization of gait changes. Perhaps it is more than mere chance that this responsive little vehicle seems to be in special favor among the denizens of Wall Street in whose daily work a kindred alertness is requisite.

It may be worth noting that the visible steam exhaust which few drivers are skillful enough to avoid, even in these sweltering days, becomes practically unobjectionable in conjested streets. Escaping near the ground it attracts no notice in the multitude of other moving objects, while, as the sole focus of gaping curiosity in the vacant thoroughfares of a minor town, it is sure to offend the conservatism of good honest folk, for a while yet.

The Three Types Compared

Steam is smart; electricity is fashionable, with a touch of indolence; gasoline is recondite and technical; here you have the positions of the three motive powers as the average New Yorker sees them. Everybody who prides himself on his technical understanding of motor vehicle problems has a soft niche in his affections for the hydrocarbon motor, and, if he has money to spare, contributes it more or less freely toward the development of one or another gasoline motor which seems to his judgment to promise an important advance step in this branch of automobilism. The adepts in gasolene and kerosene motor construction look with mild pity upon those who dawdle with other forms of power, and are inclined to consider their own knowledge of the subject as esoteric: a trifle beyond ordinary human ken. "So many points to be considered, you know, into which you" (his collocutor) "could not reasonably be supposed to have looked." That is the attitude.

Reducing Theory to Practice

All the while so many powerful brains are at work to realize in practice the undeniable theoretical possibilities of the internal combustion principle, the fruits of their endeavors are as yet most conspicuous by their absence in the streets, while the electric and steam vehicles sweep by every minute. Being a declared partisan of the gasolene (or better kerosene) vehicle faction, the writer may make this statement without invidious comparison.

Gasolene Vehicles Not Rare

After all, however, gasoline vehicles are not a rarity. But there is a characteristic peculiarity about those that are seen, which points a discouraging finger at the engineers who hope to combine high efficiency with cheap construction in the gasoline vehicle of the immediate future. It may be purely accidental, but it is a fact, that the gasoline vehicles which take part in the street travel are almost exclusively either Wintons or little motocycles, tricycles and quadricycles of the imported French types, or in other words, vehicles operated with single-cylinder motors. While the large and costly French Panhards, the German Daimlers, the Mors, Peugeot, De Dietrich and several other makes, prove successful with two, three and four-cylinder motors, our practical development still favors the single-cylinder, probably for the reason that the chances for trouble increase faster than the number of cylinders, if any little error in design or workmanship or caretaking has been committed.

Favor Muli-Cylinder Motors

Still the best hopes of the best engineers continue to be pinned to the multi-cylinder motor, and no valid argument

can be produced against them—except the results up to date on the one point of reliability.

In regard to internal combustion motor construction a surprise is reserved for the public until one converted steam engineer, whose signature was a household article in technical publications up to a year ago, shall emerge from the seclusion of the work-shop to which he has temporarily retired. He is building a six-cylinder motor, and, I believe, also the vehicle to which it will be fitted. The six cylinders are disposed in a circle and revolve while operating, thereby dispensing with the need of a fly-wheel. The pistons operate on fixed cams impinging against the free ends of the piston rods, which have a purely rectilinear reciprocating motion. Although every part of this interesting arrangement may be turned out on a screw machine, the initial cost of the experiment already reaches well toward a score of thousands —other ambitious designers in terrorem.

Among other novelties in gasoline vehicles is the tricycle previously mentioned in the columns of The Motor Age as hailing from the Western Wheel Works

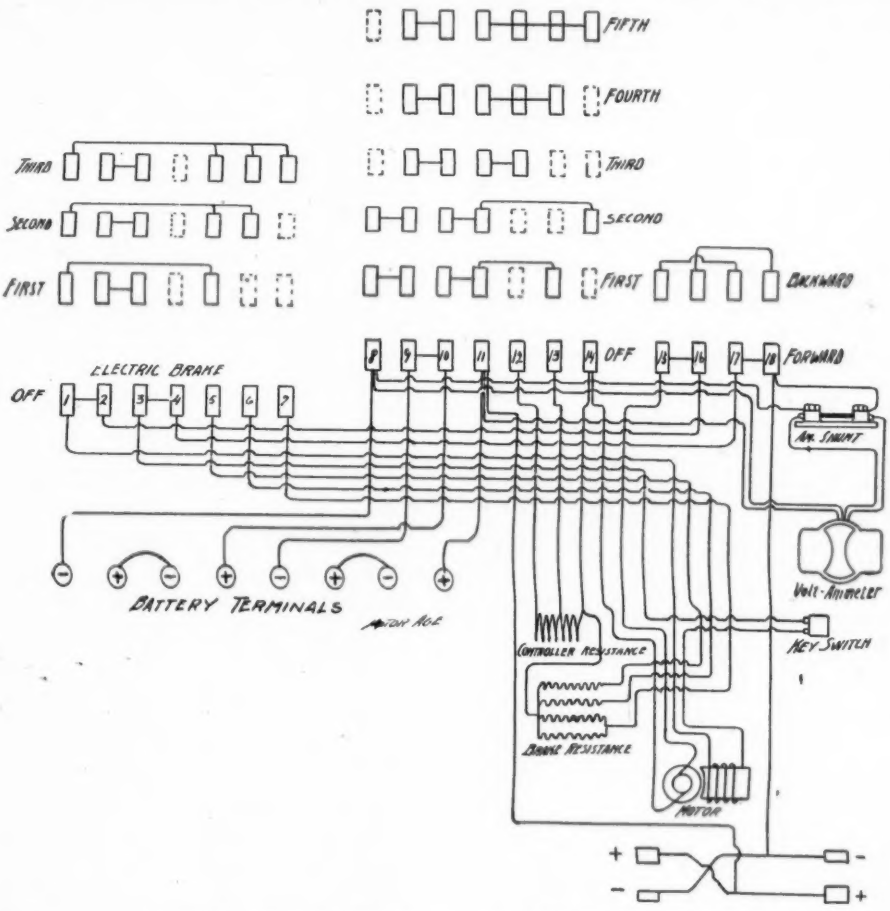


DIAGRAM OF THE WIRING OF THE WAVERLEY VEHICLES.

division of the American Bicycle Company. It is at present a little the worse for some hasty tinkering with its mechanism, but has proved itself capable of doing good service; it is a front-driven, front-steered, three wheeler the single front wheel carrying the motor attached to the fork and axle. It is an English importation frequently illustrated and described in the past; for it is, indeed, one of "Sir Harry Lawson's" well

known designs and made by the British Motor Syndicate.

A. B C Electric Vehicles

All the electric vehicles controlled by the A. B. C. are being fitted with an important improvement in the form of an electric brake, invented by R. H. Hassler, and first adopted by J. S. Conwell, chief engineer at the Waverley factory at Indianapolis. By means of a special controller with three distinct sets, which is attached to the front panel of the seat next to the regular controller of the vehicle, and a rheostat, the motor is changed into a dynamo to actuate a brake. Manager R. M. Barwise of the A. B. C. depot in this city tells me that this brake is proving a great convenience, especially for long slopes, having an easier action than any mechanical brake, while its last set is powerful enough to stop the vehicle suddenly in emergencies.

Description of Waverley Brake

There are in all eighteen contacts, connections which are varied by means of three independent controller cylinders. The speed changing cylinder controls contacts Nos. 8 to 14, the reversing cylinder contacts Nos. 15 to 18 and the electric brake cylinder contacts Nos. 1 to 7. The speed changing cylinder is actuated by means of a handle situated at the operator's left hand; the reversing cylinder is operated by means of the same handle when a button in the top of the handle is pressed down. The electric brake cylinder is operated by means of an independent lever that projects through the front of the seat.

Operation of the Controller

When the controller is in its off position the batteries are connected in series for charging. On the first notch the batteries are thrown parallel and connected to the motor through a resistance; on second notch this resistance is cut out; on the third notch the batteries are in series, connected to the motor through a resistance; on the fourth notch one-half of this resistance is cut out, and on the fifth notch the entire resistance is cut out leaving the batteries connected to the motor in straight series.

Motor Changed to a Dynamo

When the electric brake lever is thrown to its first notch the motor is disconnected from the battery, the fields are reversed, thus converting it into a dynamo, and this dynamo is connected to one coil of the brake resistance; on the second notch, another coil of the brake resistance is thrown into parallel with the first, thus increasing the dynamo current, and consequently the braking effect. On the third notch two more coils of the brake resistance are connected in parallel with the first two, thus doubling the braking effect.

Works Well in Practice

In practice this electric brake has been found to be a most admirable device. When using it in descending grades the operator sets the brake lever on one of the notches and then merely steers the vehicle down the hill. The energy that the vehicle gives by its descent is converted into electrical energy and dissipated in the brake resistance coils. These coils are placed on the lower side of the body of the vehicle and readily radiate the heat. Even on the steepest grades they do not get uncomfortably warm; there is no burning or wearing away of the parts such as would occur with friction brake shoes. No matter how long or steep the grade this electric brake remains in good working order during the entire distance and at the same time requires no manual labor in its application.

This brake, according to the statement of Mr. Hassler, the inventor, has been used during the past season by the Waverley people with great success and is daily used in many heavy vehicles in various hilly parts of the country; for example, on the Golden Gate hill of San Francisco which is approximately an eighteen degree grade.

A GLIMPSE INTO THE PAST

RICHARD III.—(On Bosworth Field. 1485)—"Gasolene! Gasolene!! My Kingdom for a quart of gasolene!"

AN EFFICIENT TYPE OF MOTOR

The requirement of an electric horseless carriage has created a demand for a type of motor not hitherto produced. The service requires a motor which shall be light, which shall be capable of operating at an overload of several hundred percent and which shall at the same time be highly efficient at an ordinary running load. There is no doubt that the variation in power required for an automobile motor is greater than that required from any other type of motor. The street car motor most closely approaches the automobile motor in its requirements. It is very difficult to obtain in a series motor for automobiles a fair efficiency when overloaded, and a high efficiency with regular running loads on account of the extraordinary variations of load. For instance, in one carriage weighing 1,600 pounds without passengers and 2,000 pounds with passengers, 6,800 watts were required to drive it up an eleven percent grade at a speed of about seven miles an hour. The same carriage with the same load required 360 watts to drive it on a brick pavement at the rate of eight and a half miles an hour.

LINCOLN ELECTRIC VEHICLE.

It is a well known fact that the efficiency of a series motor is very low until enough current flows through the field coils of the motor to produce consider-

able magnetic flux, and, while the series motor can take extreme loads with fair efficiency, it is apt to have a low efficiency on good, smooth roads, because the work required of the motor is so small in the latter condition.

The motor, with illustrated controller, shows a form of motor that it is claimed overcomes, to a considerable degree, the objections noted. This machine is compound wound and the controller is so arranged that the shunt fields is constant whatever the voltage on the armature may be. The strength of the shunt fields is the same whether the motor is running with twenty, forty or eighty volts. This arrangement makes it possible to obtain a very high efficiency of low loads, which is not possible with a series motor.

LINCOLN DYNAMO-MOTOR.

Another advantage claimed for this motor is the saving of much of the power which is usually wasted as friction in mechanical brakes.

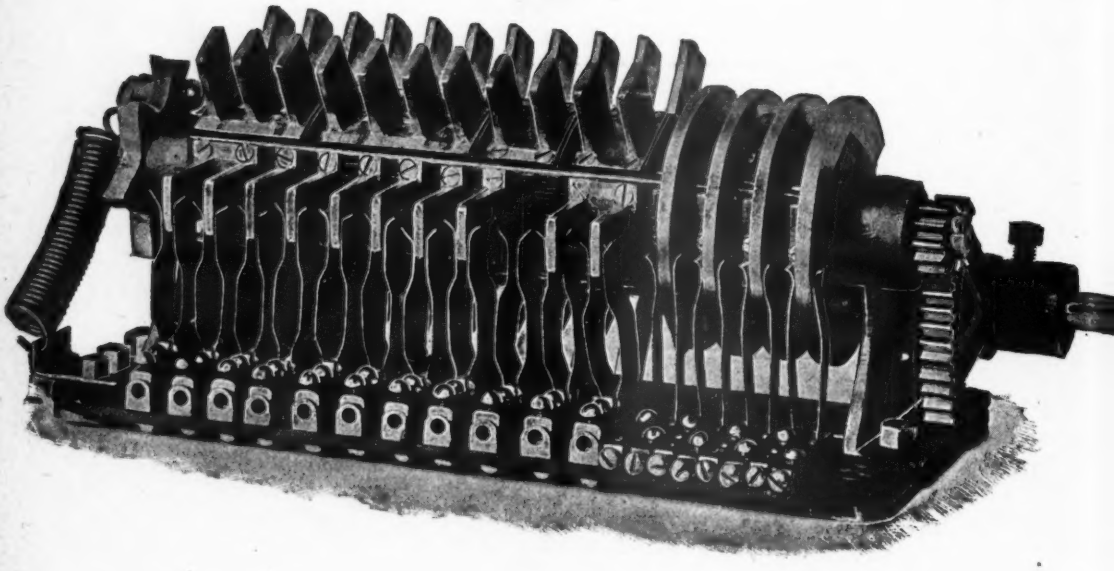
The motor drives a carriage carrying forty cells of battery and which runs at about four miles an hour on the first speed or with twenty volts on the armature. The speed is eight miles an hour on the second speed with forty volts on the armature, and sixteen miles an hour on the third speed with eighty volts on the armature.

For instance, suppose this carriage is traveling at a rate of about eight miles per hour and begins to descend a grade, the speed will be increased and the counter electro-motive force, the armature, will increase until at the rate of nine miles an hour no current will be consumed by the armature. As the speed rises to about 9½ miles an hour the electro-motive force is still further increased so that the motor becomes a dynamo and charges the battery. Any greater increase in the speed of the carriage is impossible, because a slight increase in the speed will greatly increase the load on the motor by increasing the charging current. If it is desired to descend a hill at a lower rate of speed than nine or ten miles an hour, the controller can be moved to the first speed and it will be impossible for the carriage to descend at a higher rate of speed than five miles an hour, and the power which otherwise would have been wasted in the friction of the mechanical brakes in descending the hill, will be used in driving the motor, acting as a dynamo and in charging the storage batteries. This is

also valuable in bringing the carriage to rest on a level road. If the carriage is traveling at the highest speed and the controller is moved to the second speed, the momentum of the carriage drives the motor as a dynamo and rapidly charges the battery until the speed drops to eight or nine miles an hour. When the speed decreases so that the batteries are no longer being charged, the controller can be placed at the first speed and still further charging of the batteries is effected; this brings the speed to about 4½ miles an hour. The moving energy of the carriage can be returned to a battery at any point of speed from ten to four miles an hour.

It is claimed that a carriage equipped with one of these motors can be handled with ease. The strong effect with which the batteries have been charged is very pronounced and gives the operator very exact control of the vehicle, especially when driving through crowded streets. United States patents were issued last spring and foreign patents are also pending on the invention.

This motor and controller is manufactured and sold by the Lincoln Electric Co., of Cleveland, and is furnished in the vehicle manufactured by the company, an illustration of which is shown. It is equipped with a 2½-horsepower motor, the batteries being of the Willard type, weighing 420 pounds. The complete vehicle weighs 1,175 pounds. It is claimed that the device described will give an increase of from ten to twenty-five percent in the battery radius of the carriage, according to the roads. The price is $800.



LINCOLN CONTROLLER.

FROM THE FOUR WINDS

MAJOR DAVIDSON'S TRIP

Editor The Motor Age:—

Some weeks ago I started from Fort Sheridan with a motor gun wagon to carry a message to General Miles at Washington. With the exception of two or three minor troubles such as the loosening of nuts and the short circuiting of batteries, we got along nicely to just this side of Hammond, Ind., when one of our rear tires exploded. I was using some inferior tires, but, as I had ridden some thousands of miles through Central Illinois with them, I assumed they would carry me at least 100 miles farther to La Porte, Ind., where I had contracted with the Preston Hose & Tire Co., of Everett, Mass., to have new tires for me. On sending a messenger ahead, I found, however, that they had failed to arrive. To make a long story short I was compelled to wait there; camped in the sand hills for twenty-two days before we could get our tires, all manner of accidents having happened at the tire factory in the meantime.

When we at last did receive them, having in the meantime ridden the carriage some twenty miles on a flat tire to get into a better country, it began to rain. We pushed on, however, to La Porte, Ind., much of the way through heavy black mud, and, as it continued to rain for seven days straight, I was compelled to postpone the trip on account of work at home.

I wish to say, however, that the engine did not explode nor did we have any seriour trouble aside from our tires. I am in fact so confident the trip can be made that I am now planning to build another carriage and take a battery of two carriages with this message to Washington. This I hope to be able to do some time in October.

Generals Wheeler and Miles have both given their consent to retain the message. As we have never failed in carrying out what we started to do in the past, we do not intend to on this.

In the meantime I would appreciate a correction of the wide spread report that our engine blew up. The Associated Press reporter at La Porte saw us giving an exhibition of this carriage while at La Porte before loading on the train, and saw us ride the carriage up the incline to the platform, dodge in and out among the freight, and stop the carriage inside the freight-house.—R. P. Davidson, Highland Park, Ill.

NEW YORK TO MILWAUKEE

William Curlyn and wife of New York recently completed a vacation trip in their automobile, which carried them from New York to Milwaukee. The trip was made without accident and was thoroughly enjoyed by both the tourists.

Mr. Curlyn deprecated any newspaper attention toward his trip, but answered questions put by a Milwaukee reporter.

"My wife and I left New York a month ago," said he, "and we have been making easy stages without attempting a record trip, although one day the auto made 145 miles. The weather was good all through New York, Ohio and Indiana, but it has been rather bad weather in Illinois and Wisconsin. The vehicle ran all right, though, in bad weather as well as good. I came from Racine to-day. My wife came from there on the boat, and I in the automobile. The boat wanted to charge $7.35 for bringing the vehicle, and I thought it was too much. I was stopped three times by the rain. The first stop was ten miles this side of Racine, the second about two miles further, and the third at South Milwaukee, where the afternoon shower overtook me. It ran well in spite of the muddy roads, but when I struck paved streets again I felt relieved."

AN ENCOUNTER WITH A HAY RAKE

Dr. C. E. Ruth of Keokuk, Iowa, had an experience which he insists was harrowing, despite the fact that it was an

encounter with a hay rake. Probably the doctor is not as familiar with that class of surgical instruments that is used on farms as with the kind common to hospitals. But let the facts speak for themselves:

The doctor started from his home in Keokuk for New London. On the road he met several horses which did not regard his automobile with the greatest favor, but he managed to avoid trouble by giving them all the room they wanted and stopping his vehicle. When, however, he met a hay rake in the wake of a restive pair of equines, it was different. The horses insisted on cutting up didoes peculiar to the species, although the doctor was sitting quietly by the roadside. Even when they appeared to be safely past, they inaugurated a retrograde movement which brought the business end of the rake in close proximity with the doctor's rig. The doctor realized that it was no time to stand on the manner of his going, and he got. There was only one way to get, and so he promptly backed up. The noise made by the motor assisted in the removal of the rake, for the horses immediately changed their direction of travel, and the rake and auto parted company. The driver of the rake would also have parted company with it except that when he fell he fell directly in the road of the teeth of the rake and was carried safely if not comfortably away from the neighborhood of the—to him—useless carriage.

THE AUTOBUS

An old lady who had come in from the country on the Northwestern railroad stepped into one of the horseless carriages that are now run from the Wells street station to the shopping district, says the Chicago Times-Herald. She approached the carriage from the rear, and didn't notice when she got in that there were no horses hitched to the thing. Her whole attention was being paid to the "runner" in the blue uniform, who stood on the sidewalk looking for passengers.

"How much do you charge?" she asked.

"Five cents," he said. "Take you right over to State and Madison. Going right away. Step in. Room for just one more."

The old lady settled back comfortably in the easy seat to which she had been assigned, and a moment later the carriage was bumping along over paving stones, dodging in and out among trucks, sliding sidewise in slippery car tracks, and grazing elevated railroad pillars. A row of men sat on the cross seat in front of the lady, shutting out the view ahead, so she sat with her hands in her lap and rode contentedly along. At the corner of Madison and Dearborn Streets several passengers got off, and then for the first time the lady from the country had a chance to look out in front. She saw the operator pull a nickel-plated lever; then she glanced over the dashboard. There was a look of mingled alarm and wonder on her features.

"What's happened to the horses?" she exclaimed.

"There ain't any horses," said a boy who was hanging on the steps behind.

The old lady stood up just as the man in charge of the automobile rang his gong and started ahead.

"Ho! stop!" she cried. "Let me out! I won't ride in this thing! Stop it! Stop it! Help!"

"Madam," said one of the passengers, "there's no reason to be alarmed. It's perfectly safe. We are——"

"No!" she replied. "I wouldn't have got in here for a hundred dollars if I'd have knew what it was! Let me past!"

The carriage had stopped, and she began to tramp on the feet of the other passengers in her hurry to get out.

"We're almost there—only half a block farther," some one said. "You better stay in."

"I wouldn't stay in if it was only half a foot farther," she declared, as she scrambled down the steps. Then she stood on the sidewalk, watched the automobile move on through the crowded street, put her hand over her heart, and said:

"My! That's the narrowest escape I ever had! And me with all that money in my pocket to pay pa's insurance, too!"

PROHIBITIVE RESTRICTIONS

The citizens of Southampton, Long Island—or those of them who are owners of horses—have drawn up an ordinance

which they are asking the trustees of the village to enact. It places prohibitive restrictions on the use of automobiles within the limits of the village. If the ordinance is passed every automobilist will be obliged to stop when meeting a horse, if the driver thereof raises his hand, and must reduce speed to three miles an hour when passing horses, churches and bathing beaches. But the most ridiculous part of the proposed ordinance is the section that provides that no automobile shall be permitted to enter the railroad station grounds at train time.

It must be an illy trained lot of horses which will take fright at an automobile more readily than at a locomotive. But perhaps the good people of Southampton are afraid that the locomotives will become frightened and unmanageable.

TO STUDY THE AUTOMOBILE

Another proof of the importance of the automobile and the strong foothold which it has gained is shown in the attitude of the Rose Polytechnic Institute of Terre Haute, Ind. That institution, which has recently been equipped with new tools and machinery, will hereafter give much attention to the automobile, according to a statement by its president.

The practical study of the self-propelling vehicle in our technical schools is certainly along the line of common sense. The automobile has come to stay, and its general use is only a matter of time and reduced cost. One will follow as surely as the other, and a study of its many ways of possible construction in the technical school may bring about the very results in reduced cost which we are all now looking for.—Hartford Post.

A CURIOUS ACCIDENT

The following incident happened to a motor tricycle in Paris, which was being ridden by the employe of a motor firm across the Quai Michelet at Levallois. Suddenly the tricycle stopped working and came to a standstill. The motorist dismounted to examine the wheel, but forgot to turn the stopping lever. As soon as the man touched the motor it suddenly made a dash and tore down the street, the rider in hot pursuit. He was able to clutch hold of the handle-bar, but was knocked down by an unexpected turn of the machine, which altered its route, cut across the pavement and jumped into the Seine, vanishing with a loud splash, while the poor chaffeur, ruefully gathering himself up, gazed at the waves and bubbles with a ridiculously dazed expression on his face.

AUTOS ON THE FARMS

The automobile is to be turned to practical account by the farmers of Kent, England. Every year a large part of the fruit crop rots from lack of transportation, the railways not being able to meet the emergency, and the plan, according to the Chicago Chronicle, is for the farmers next year to take things in their own hands, starting motor cars round the orchards during the evening and night and bringing the day's pickings to London by the early morning.

A HORSELESS AMBULANCE

Boston's public ambulances now have a competitor from which it will be hard for them to take away cases. It is an automobile ambulance, said to be the first ever used in the United States, and in every respect the wagon and equipment seem to be exactly what is needed to handle accident cases. The automobile was built in Philadelphia, and can carry as many as four patients without great crowding. The exterior, according to the Boston Transcript, is much like the ordinary delivery wagons with which Boston people have become familiar. On the sides are the words, "Wage Earners' Emergency Hospital." The interior of the wagon has a double floor, and each floor is wide enough to admit two stretchers. Under ordinary circumstances the top floor will be strapped up against the side, and there will be a stretcher and a seat for an attendant upon the wagon floor.

Besides the stretchers which are to be carried the wagon is equipped with a large surgical case, a medical case, a case containing surgical instruments, stationary medicine chest and a tank of

oxygen to be used in cases of suffocation and drowning. With this equipment a complete temporary hospital can be set up by the attendant, and all sorts of injuries treated, as in a railroad accident or at a large fire. The power by which the automobile ambulance is run is a storage battery considerably lighter than those which are in general use. This battery on one charging will carry the ambulance forty-five miles at a rate of fifteen miles an hour.

TO TRY TO OPEN FAIRMOUNT PARK

Philadelphia, Sept. 3.—That hustling infant, the Pennsylvania Automobile Club, will, at the meeting of the Fairmount Park commissioners on the fourteenth of this month, try to induce that august body to keep its promise, made about a year ago, to open the entire park to automobiles provided a thorough trial should demonstrate their harmlessness. Notwithstanding the fact, that, since that promise was made, the number of self-propelled vehicles in the city has quadrupled, but one park accident has been directly traced to an automobile, and that one did not result seriously.

The officials of the Pennsylvania Automobile Club have been gathering statistics ever since the club was instituted, and, at the coming meeting they purpose opening a rapid fire of arguments before which they hope the objections of the old fogies will avail nothing. Philadelphia is now the second city in the country as regards the number of automobiles in daily operation on its streets, being exceeded in this respect by New York alone, and the time is fast approaching, when, if arguments prove ineffectual, the park commissioners will be compelled to succumb to the force of numbers.

A quiet poll of the committee is said to have revealed the fact that a majority of its sixteen members favor a wide-open park to all types of automobiles provided it be demonstrated that it can be done without danger to the hundreds of drivers who daily throng its roads. This the ardent young Pennsylvanians are prepared to do on the fourteenth, when it is to be hoped the commissioners will see the matter in the proper light and grant the long-desired boon.

BOVINE MOTIVE POWER

A most ludicrous scene took place in Weiler Altenfurth, a village in the neighborhood of Nuremberg, a few days ago and it is to be trusted that the ubiquitous camera fiend did not let this glorious opportunity of "snap-shotting" a curious combination of cow and motor car pass by. The hero of the incident was a young "elegant," who was driving an automobile just as spick and span as himself, when the vehicle suddenly refused to obey its master and rested by the wayside, an incarnation of obstinacy. The owner was in great perplexity, as he could not, being a novice himself, induce the car to move, and he requisitioned the aid of a cyclist passing by who promised to send him help from Altenfurth. When assistance at length arrived it proved to be embodied in the shape of a fat cow tethered to a long rope and led by an ample-bodied landlord. Mine host harnessed the animal to the car and jumping up beside the unfortunate chauffeur, who was rendered nearly speechless at the sight of the animal, he set the cow in motion with a loud crack of his long whip. All Altenfurth was in a state of excitement when the extraordinary procession hove in view and a few motorists who were refreshing themselves at the inn and who speedily repaired the fractious car, took good care to spread the tale about, to the distress of the young gentleman chiefly concerned.

CLUB TOURNAMENT HEADQUARTERS

Dr. M. B. Pine, chairman of the committee on headquarters for the Chicago Automobile Club, announces that the committee has arranged for headquarters for the week of the Chicago Inter Ocean tournament for the club and its visiting guests at the Victoria Hotel, at the corner of Van Buren Street and Michigan Avenue. This hotel is the most conveniently located of any in Chicago for the purpose.

CONSTRUCTION OF A GASOLENE MOTOR

THE PRACTICAL CONSTRUCTION OF A FOUR-HORSE-POWER AUTOMOBILE GASOLENE MOTOR WITH TWO OPPOSED CYLINDERS, ACCOMPANIED BY WORKING DRAWINGS.

BY L. ELLIOTT BROOKES

PART III.

Figs. 24 and 25 show respectively a side view and a plan of the connecting rods, of which two are required. They are made of phosphor bronze. Very neat patterns should be made for the connecting rod and its cap, and 3-16 of an inch holes for the 3-8-inch philister head screws, and tap out four 5-16-inch hexagon nuts to 3-8-inch, 16-thread, to fit the screws as shown. Do not attempt to use larger nuts by spreading the holes. This cannot be done and still allow proper

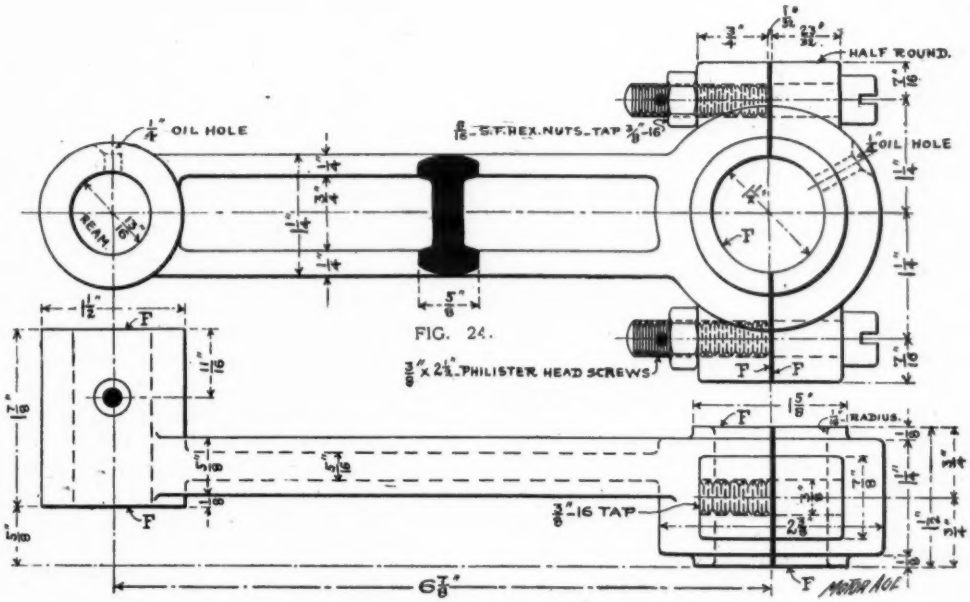


FIG. 24.

FIG. 25.
CONNECTING ROD.
2—Phosphor Bronze.

to the foot allowed for shrinkage. The first operation is to drill the hole for the wrist pin. To do this the rod should be suitably clamped to the table of a drill press, preferably a back geared one, as phosphor bronze is very hard to drill without chattering. Use a drill 1-64 of an inch smaller than the hole shown, which is 13-16 of an inch, and then ream out to size while still clamped to the table of the drill press. Next plane off the ends of the connecting rods and the bottoms of the caps to the dimensions given in the drawings; locate, drill and tap the clearance between the connecting rods and the inside of the crank chamber. After bolting the caps onto the connecting rods with 1-32-inch thick liners, as shown, make a stud or pin out of at least 1¼-inch round steel. Turn down one end to fit the slot in the face plate of the lathe, making it long enough to put a nut and washer on the back of the face plate. Then turn the other end down to 13-16 of an inch to fit nicely in the wrist pin hole of the connecting rod, leaving between the turned ends a shoulder at least ¼ of an inch thick and the full diameter

of the material used. Now put the stud in place in the slot in the face plate of the lathe, and locate it exactly 6⅞ inches from the center. This can be done by using the live center of the lathe, which, if worn, must be re-turned in order to get a good sharp point from which to measure. Put the connecting rod on the stud with a parallel strip of the required thickness behind, and clamp to the face plate by means of the I section of the rod. True up the hole which is to be bored, so that it is exactly central between the screws which hold the cap in place and bore out the hole to 1¼ inches, as shown on the drawing. Finish facing and put a 1-16-inch round corner in the hole. Then unclamp and reverse the connecting rod on the wrist pin, and after re-clamping and truing up (this time by the 1¼-inch bored hole), finish facing and round the corner on this side, to the thickness shown in Fig. 25. Now put the connecting rod on the mandrel to fit snugly in the 13-16-inch reamed hole, and finish the ends of the wrist pin bearing boss to the dimension required.

This is the only way a perfect job can be done on these rods without the use of jigs and templets. The connecting rods can now have their oil holes drilled as shown in Fig. 24, and will then be complete and ready for use.

The crank shaft shaft is next in order. Figs. 26 and 27 show a side and end view of it. It can be made from a forging, or a pattern made and a steel casting used, which the writer prefers, as it involves much less machine work than with a forging. In the pattern 3-16 of an inch to the foot must be allowed for shrinkage and, also, not less than 3-16 of an inch allowed for finish, in order to get below the pin holes and scale which always exist on such castings. Do not omit to put a strut about ⅞ of an inch in diameter between each of the crank pin jaws, so as to form a continuation of the crank shaft. These struts are to keep the casting from warping when being annealed, for, if left out, a badly warped casting will be the probable result. These struts can be left in until it is time to turn down the crank pins and will help materially to stiffen the shaft while roughing it out.

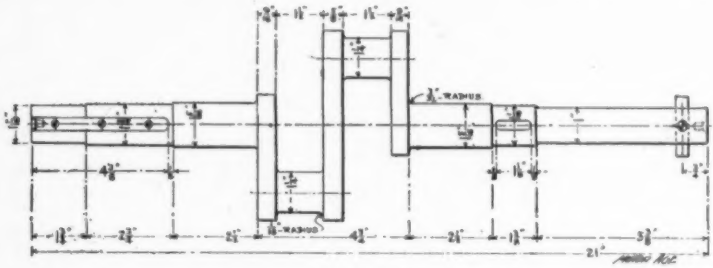


FIG. 26.

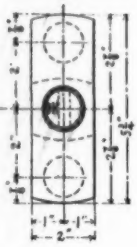


FIG. 27.

CRANK SHAFT
1—Steel.

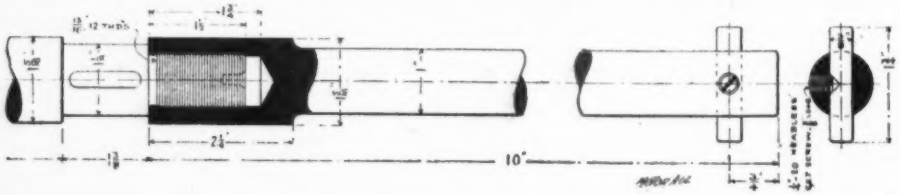


FIG. 28.

FIG. 29.

EXTENSION SHAFT
1—Steel.

Figs. 30 and 31 show a jig, two of which are needed for turning the crank pins. A pattern is needed, as they are made of cast iron; after the crank shaft is properly centered and has been roughed out, turn down the parts destined to be the journals to 1 7-16 inches to fit the jigs.

Locate the jigs exactly right and turn down one crank pin; then reverse and do the same to the other. Do not attempt to turn up the crank pins by putting cen-

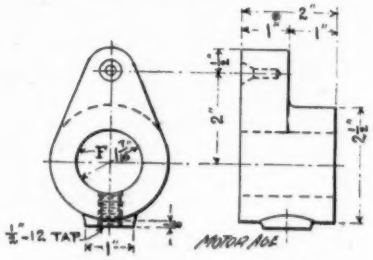


Fig. 30. Fig. 31.
Jig for Crank Shaft.
1—Cast Iron.

ers in the cheeks of the crank jaws, as by this method the probability of the crank pins being in line with the crank shaft journal is very remote, and further, it is very poor shop practice and should not to be tolerated by any intelligent mechanic.

The jigs for turning up the crank pins should be placed as far apart as possible from the journals, to insure a perfect alignment of the crank pins and crank shaft journals. A strut should be placed in the crank jaw of the pin not being turned, to prevent springing while turning up the other pin.

The crank shaft as shown in Fig. 26 has a short end to use for connecting it with the starting lever. If, however, it is desired to use a longer one, it is still advisable to make the crank shaft with the short end, with an extension piece screwed on, as shown in Fig. 28. The direction of rotation of the motor must be decided upon, however, before the thread is cut upon the end of the crank shaft. If the motor is to run right handed from this side, that is,in the direction of the hands of a clock, the thread must be cut right handed; if the contrary direction, left handed.

Turn up all the sizes on the crank shaft exactly to the dimensions on the drawings, and do not omit the fillets shown in the corners and on the crank pin and crank shaft journal cheeks, as they stiffen and also strengthen the crank shaft very materially and should, on no account, be left out. In turning up the crank shaft journals, after the crank pins are finished and the jigs removed, the bushings (Fig. 7) should be slipped on each end, on the smaller parts, before placing the crank shaft between the centers of the lathe, so they can be tested for fit. They should go on easily, yet without any shake. The crank pins, in like manner, should be fitted to the connecting rods.

Fig. 29 shows the pin for use in con-

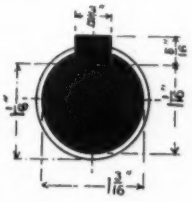


Fig. 32.—Section through Driving Gear End of Crank Shaft.

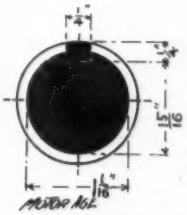


Fig. 33.—Section through Cam Gear Pinion Part of Crank Shaft.

nection with the starting lever, and should be made as shown.

Figs. 32 and 33 show plainly the location and depth of the key ways for the keys shown in Figs. 34 and 35, which are for the flywheel, and the exhaust cam gear pinion ends of the crank shaft, respectively.

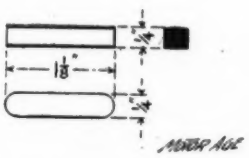


Fig. 34.—Key for Pinion.
1—Steel.

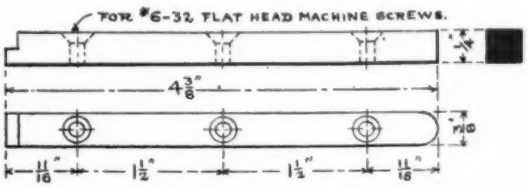


Fig. 35.—Key for Fly Wheel.
1—Steel.

The small key shown in Fig. 34 for the pinion driving and exhaust cam gear can be fastened in the shaft very nicely, after it is tightly fitted in place, by drilling two holes about 3-32 of an inch

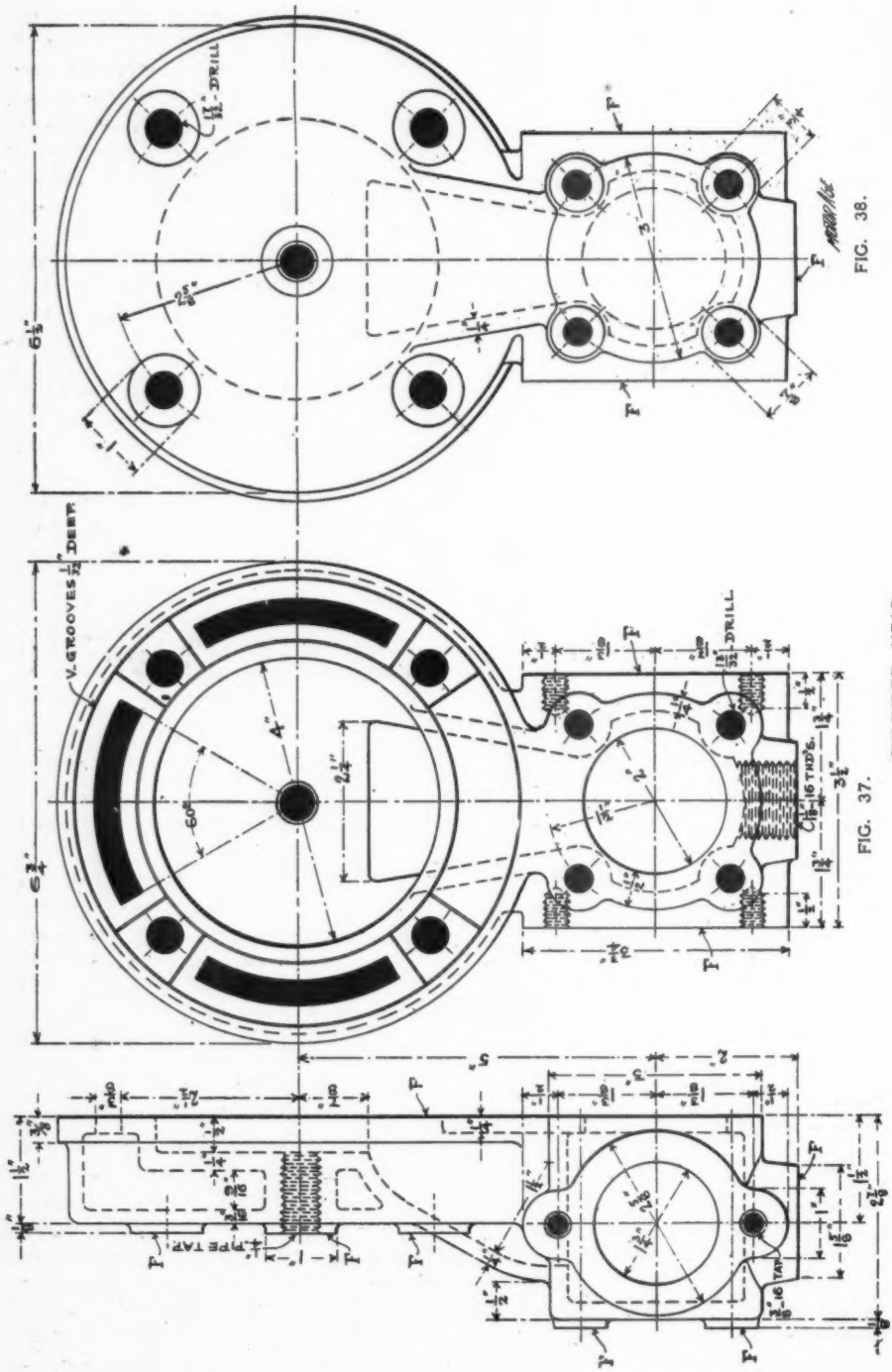


FIG. 38.

FIG. 37.

CYLINDER HEAD.
2—Cast Iron.

in diameter into both key and shaft, one hole at an angle of about 15 degrees in one direction and the other at a similar angle in the opposite direction. Drive in two pins which should fit these holes tightly and file off level with the top of the key. The crank shaft must then be put in a lathe, and the top of the key turned off to the diameter of the crank shaft journal as shown in Fig. 33. This is so that the crank shaft can be put in place in the crank chamber, or removed, without removing this key. It is a very ugly job, especially with a small, nicely fitted key of this kind, to get it out of its seat. Turning it down will save not only loss of time, but a probable loss of the key in taking the crank shaft out or putting it in place. In drilling the centers in the ends of the crank shaft and also in the jigs, use center drills, if possible. They are inexpensive and their use will result in more accurate work, and, consequently, better results than can be obtained by drilling a small hole first and then using a home-made countersink.

Next come the cylinder covers, of which the explosion chambers form parts, as shown in Figs. 36, 37 and 38, from which, in connection with the section shown in Fig. 2, their construction can be plainly seen and understood. Three openings are shown into the water jacket space, but only two are used, the center one being put in at the molder's request, to more properly support the core in the sand. The passage shown from the explosion chamber to the cylinder head is of equal area throughout its course and is of ample capacity for the explosion chamber. The castings must be of a very high grade iron and well molded.

Hold in the lathe chuck by the outside end of the cylinder cover portion on the casting and the face of the flanges, truing the casting up, however, by the outside of the flanges and the 4-in. hole. Turn in the small 1-32 V grooves as shown in Fig. 37. After removing from the lathe, cut in the chisel marks from one groove to another but not farther. These grooves are to make a tight joint with the cylinder by means of the packing on the cylinder becoming imbedded in them, and should not be omitted if tight joints are wanted.

Next put on a shaper and face off the boss on the cylinder cover and the back of the explosion chamber to the height given in the drawings. Then plane off the two side facings on the explosion chamber to figures. Before doing so, however, center lines should be established, as shown in the drawings, and the planing done to this. Then lay out the through and tap drill holes to figures, as shown.

The 1 1-8-inch, 16-thread holes for the ignition plugs had better be done in the lathe as follows: Clamp the cylinder cover, finished face down, to an angle plate securely attached to the face plate of the lathe with the ignition plug opening towards the tail stock. True up and face off the end of the boss and then bore out the hole and cut the thread to size, as shown. The ¼-inch pipe tap can now be put in the center of the cylinder cover and the head is complete with the exception of the studs for the admission valve chambers and for the cover plates which are shown in Fig. 39. Eight of these are required, of cold drawn or Bessemer rod steel, made in the manner previously described for the studs shown in Fig. 8 and 9. After these are finished they must be screwed tightly in place.

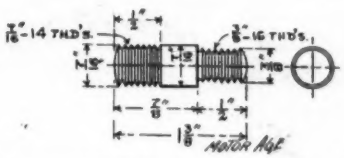


Fig. 39. Admission Valve Chamber and Cover Studs. 8 Steel.

Next in order are the valve chambers, the first of which, the exhaust chamber (which must be made of high grade cast iron), is shown in Figs. 40, 41 and 42. which are the face, sectional and end views respectively. The pattern and core box for this part should be carefully made. True up in a lathe chuck with the valve seats outward, face off the end and bore the hole out to 1¼ inches, according to the drawing. Put a 45-degree countersink in the edges of the hole, 1-16 of an inch, as shown. Use a center tool in the valve stem hub, and then run a small drill through first, followed by a 3-8-inch

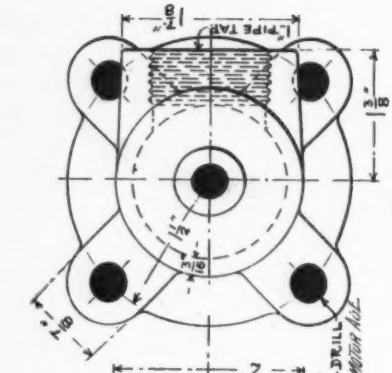


FIG. 42.

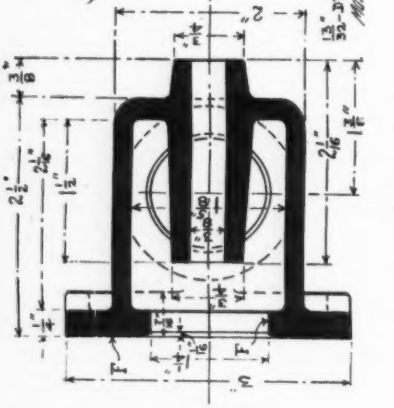


FIG. 41.
EXHAUST VALVE CHAMBER.
2—Cast Iron.

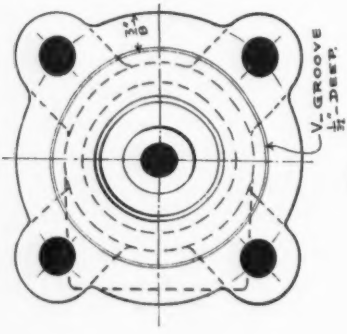


FIG. 40

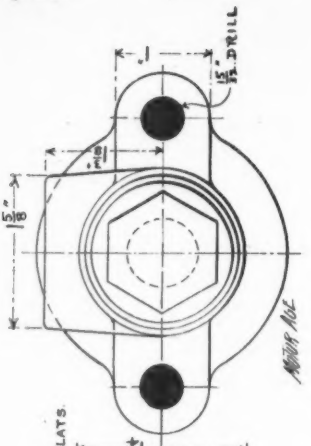


FIG. 46.

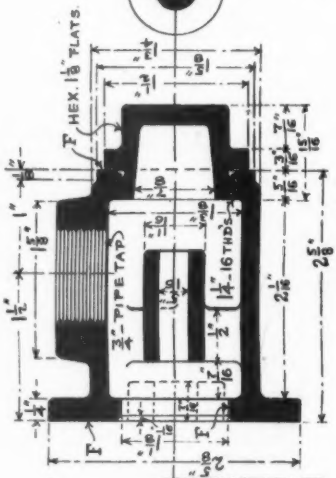


FIG. 45.
ADMISSION VALVE CHAMBER AND CAP.
2—Cast Iron.

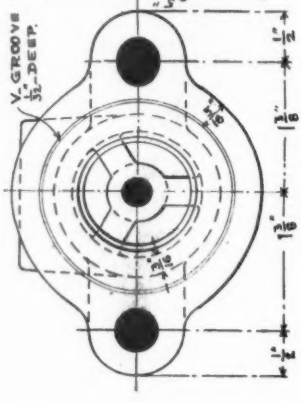


FIG. 44.

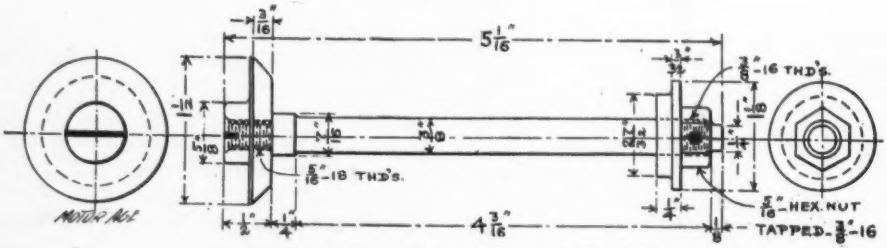


FIG. 43.—EXHAUST VALVE AND SPINDLE.
2—Steel.

drill. Do not try to make a reamer fit, as the valve stems need a little play to prevent them from sticking. Turn a V-groove 1-32 of an inch deep in the face, as shown, to insure a tight joint with the packing. Then lay out the bolt holes and drill to size, as shown. The 1-inch pipe tap hole is best finished by clamping the end of the 5-8-inch hub on the valve, rough out all over, almost to size, and cut off. Screw the valve in place on the spindle, rivet the latter over firmly and turn down the valve and spindle to the size shown. Also cut the thread on the end of the spindle for the spring cap nut, after making spring caps, which may be

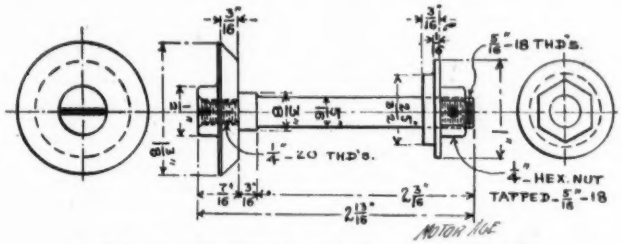


FIG. 47.—ADMISSION VALVE AND SPINDLE.
2—Cast Iron.

chamber to an angle plate fastened to the face plate of the lathe and boring and threading in this manner.

Then come the exhaust valves. Take a piece of 7-16-inch cold drawn or Bessemer rod steel about 5 1-8 inches long, carefully center it, turn down to size on

of steel or rod brass, as desired. Put the nut on the thread to the position shown and drill for a 3-32-inch split pin. This nut should be 5-16-inch hexagon, tapped out 3-8-inch, 16-thread. This exhaust valve spring should be coiled to be 7/8-inch inside diameter, and be of wire equal

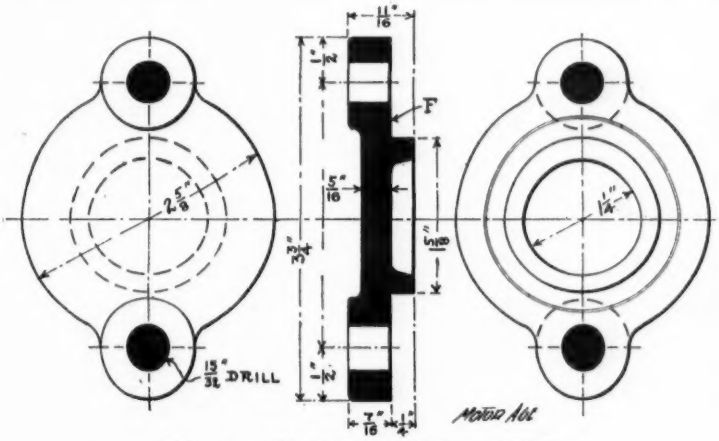


FIG. 48.—EXPLOSION CHAMBER COVER.
2—Cast Iron.

valve end and cut the thread as shown, slightly undercutting at the shoulder to allow the valve to fit up close. Next take a piece of steel large enough to turn down to the outside diameter of the valve, which is 1½ inches, and true it up in the lathe chuck and drill and tap for 5-16-inch, 18-thread, as shown in Fig. 43. Slightly countersink the hole in the

to No. 22 gauge piano wire. Oil tempered springs should be used if possible.

The admission valve chamber is shown in Figs. 44, 45 and 46, and instructions with regard to material, pattern and machine work, except as to dimensions, are the same as for the exhaust valve chamber. After drilling the holes for the studs, clamp the valve chamber to the face plate

of the lathe, true up by the hole for the spindle, cut the ¼-inch, 16 thread, and face off the end to size. The small cap, or plug, is of cast iron or brass, as desired,

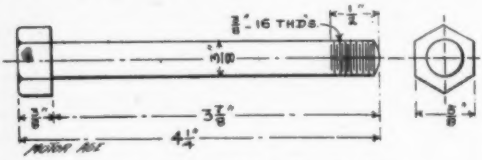


Fig. 49.—Exhaust Valve Chamber Bolt
8—Steel.

and is finished up on its flange and faced and threaded to fit the admission valve chamber. The hexagon portion of the cap is left rough.

The admission valve and the spindle for it are shown in Fig. 47. Use No. 20 or 22 gauge piano wire, and have the inside admission valve spring 13-16 of an inch in diameter.

Fig. 48 shows three views of the cap to cover the openings opposite to the place where the admission valve chamber is bolted on. These are of cast iron, as before, and need no explanation further than that each is simply finished in a lathe on one side, a V-groove turned in the face, as shown, similar to that in Fig. 44, and holes are drilled for studs, as indicated in the drawings.

Fig. 49 shows the tap bolts for holding on the exhaust valve chambers. Eight are required of 5 8-inch hexagon steel.

Fig. 50 shows two views of the plunger rod and roller for opening the exhaust valve. The roller should be made of tool steel and hardened. The plunger rod can be turned out of a solid piece or made from a forging, as desired. The corners of the rectangular part are to be turned off, as shown, to a 1-inch diameter, before the slot is milled for the roller. The 5-16-inch pin for the cam roller should be cut off about 1-32 of an inch longer than the dimension in the drawing, so to allow for riveting over after the roller is in place.

The guide for the plunger rod is shown in Fig. 51. It should be made of a good hard brass or bronze casting. True it up

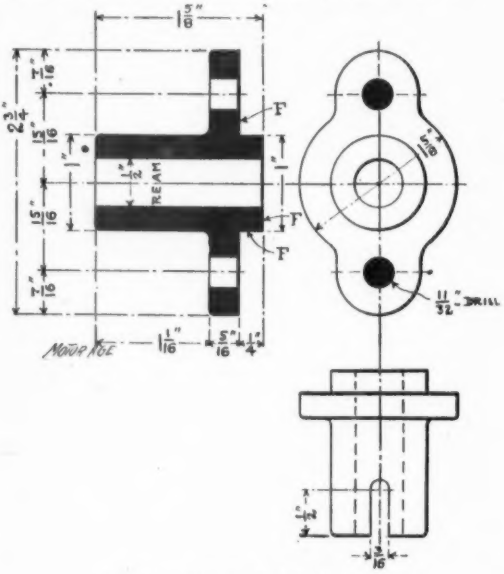


Fig. 51.—Plunger Rod Guide.
2—Bronze.

in a lathe chuck, with the shoulder end out, finish the flange face and shoulder, and drill and ream the ½-inch hole. Then drill the 11-32-inch holes for the holding down screws. The best manner to machine the slots for the guide pin is to clamp the plunger rod in the hole in the proper position (before putting the roller on the plunger rod) and to drill a hole through both the guide and stem of the plunger rod, drilling on centers in a lathe, from both sides, using a drill somewhat smaller than the correct size, and finishing with a proper sized drill. Make the 3-16 inch pin a driving fit in the plunger stem. The holes in the guide stem can now be cut through, either on a milling machine or a shaper, and the piece is finished.

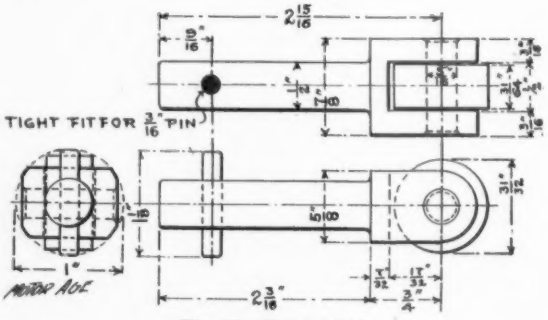


Fig. 50.—Plunger Rod.
2—Steel.

Fig. 52 shows the exhaust cam and sleeve, which should be made of tool steel of the best quality. It may be turned up eccentrically out of a solid piece, 1¾ inches in diameter, or made from a forging. Hold in a lathe chuck by the straight end, and drill and ream out the plete outline of the cam, which is of the proper shape for a 120-degree throw, which allows the valve to open ¼ of an inch before the end of the out stroke, and to close exactly at the end of the in stroke. The shoulder shown on the sleeve next to the cam is for the cam gear to

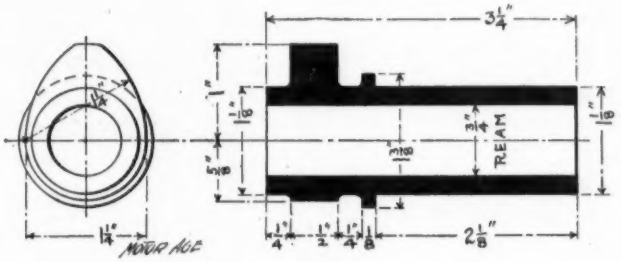


FIG. 52.—EXHAUST CAM AND SLEEVE
2—Tool Steel.

hole to ¾ of an inch in diameter, as shown. Now put on a mandrel and finish all over outside, including the high part of the cam. Then put a center in the end of the ¾-inch hole, next to the cam, and lay off on the face of the cam a circle 1¼ inches in diameter. Get a center line on the cam at right angles to a line passing through the high part of the cam abut against, and should have a perfectly square corner, as shown.

The stud for carrying the exhaust and igniting operating mechanism is shown in Fig. 53. If carefully centered, a piece of steel of the exact size shown, 1 1-8 inches in diameter, may be used. The cam sleeves should be fitted to the stud, so as to insure a smooth running fit.

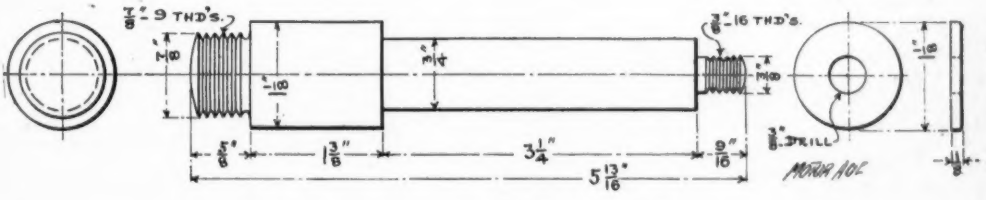


FIG. 53.—EXHAUST CAM GEAR STUD.
2—Steel.

and from this center line, where it intersects the 1¼-inch circle, strike the two side arcs, as shown, each with an 1¼-inch radius, which is equal to the diameter of the circle. This will give the com-

Fig. 54 shows the washer for holding the cam sleeve in place on the stud. The washer, itself, is held in place by a 3-8-inch semi-finished hexagon nut, which is shown in position in Fig. 2.

STEAM AIDED BY CARBONIC ACID GAS

Two features of letters patent No. 656,962, dated August 28, 1900, and granted to Charles D. P. Gibson of Jersey City, N. J., are interesting. The first is the arrangement of the steering gear and controlling lever and is shown in Fig. 1.

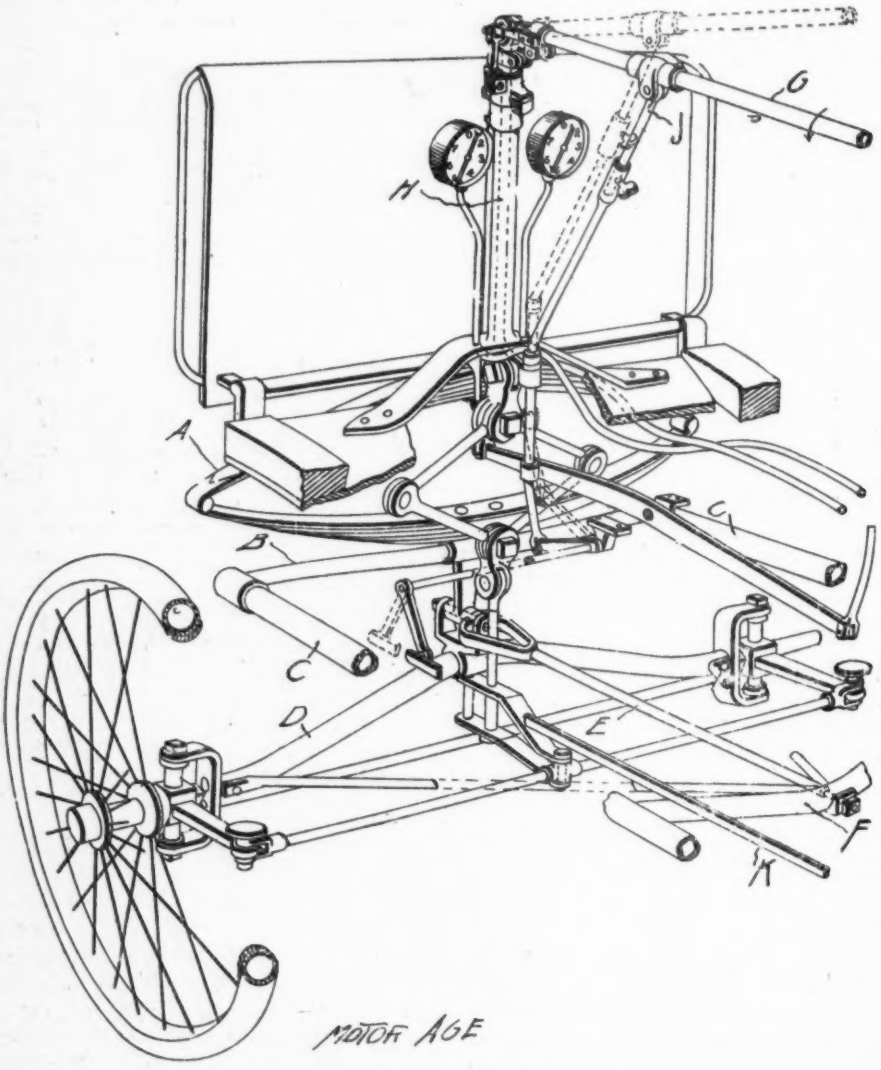


FIG. 1—GIBSON'S PATENTED STEAM VEHICLE.

The forward body spring A is mounted upon a cross bar B which rigidly connects the side reaches C of the frame. Depending from the center of B is an arm terminating in a longitudinally disposed sleeve which is pivotally connected within a yoke mounted upon the front axle-tree D. A tie-rod E connected to the pivoted sleeve by a loop for the passage of the steering stem, runs backward to the center of frame cross-bar F to which it is pivotally attached as clearly shown in the

illustration. This arrangement of the parts allows the front axle-tree to rock in relation to the vehicle frame so that the wheels may adjust themselves to uneven ground.

The steering wheels are mounted on swiveled stub axles of usual construction and the steering stem which governs them is divided between its lower extremity and the point where it passes through the vehicle body floor. The division allows the interposition of four hinged links which form a yielding connection between the two portions of the stem, thus allowing for rise and fall of the vehicle body on the frame.

Connections between the handle G and the post H and the steering stem are so made that the said handle G has three distinct movements. It may be swung from side to side to steer the vehicle, its rear end may be raised and lowered and it may be rocked or twisted to operate connections whereby through these last movements the steam chest controlling device may be actuated to stop and start the engine. The rod J by cranks and cross bar operates the long link K which is connected with the engine reversing mechanism. By raising the controlling handle G the vehicle may be backed.

The steam boiler and engine are of ordinary construction in most points, though the inventor has supplied some original detail in the way of automatic fuel regulator, water pump, etc. One of the hydro-carbon burners in the fire chamber is supplied direct from the fuel pipe through a connection independent of the shut-off valve controlling the supply to the other burners. This arrangement, states the inventor, allows all of the burners but this one to be turned out without permitting the fire chamber to cool sufficiently to prevent ready generation of hydro-carbon vapor. When it is desired to restart the fire the regular supply to the other burners is turned on and the constantly burning one lights the rest.

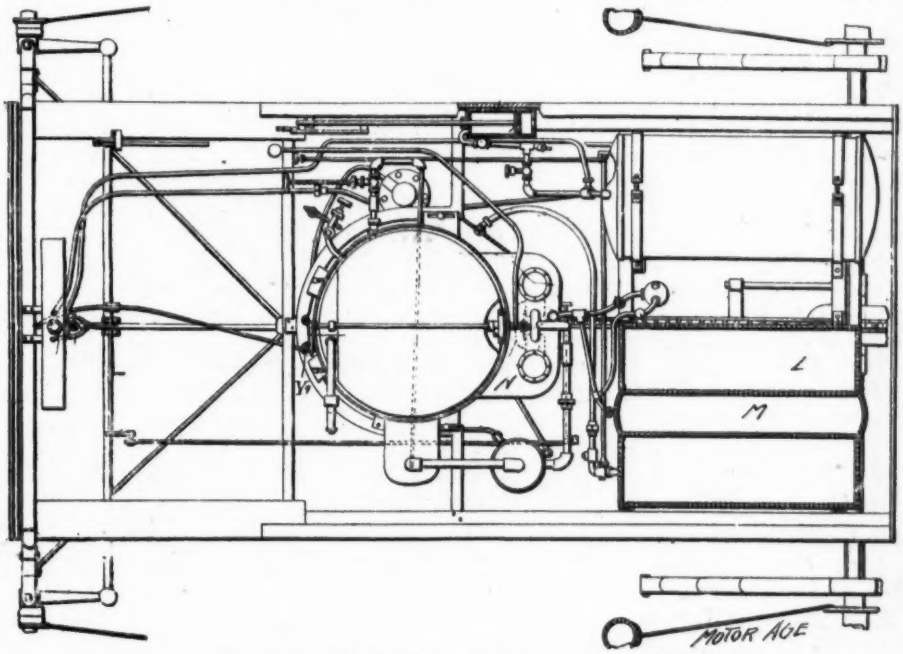


FIG. 2 GIBSON'S PATENTED STEAM VEHICLE.

The gasolene tank is in the rear of body at the left hand side and is provided with such conveniences as partitions to prevent constant slopping of the gasolene from one end of the tank to the other when the vehicle is jarring or running over rough surfaces, and a double end discharge to flame feed pipe whereby the gasolene will run out of the tank

readily from one end or the other when the vehicle is traveling up or down a grade respectively, even though the supply is low at the time.

Running centrally through the water tank L, Fig. 2, is a tank M which is charged with ordinary carbonic acid gas. Suitable connections between this tank and the steam chest N permit the carbonic acid gas to be discharged into the steam chest through an oil reservoir and thus carry oil with it to the cylinders; or it may be discharged into the steam chest direct from the tank and in quantities to suit, and with regular supply of steam or when but a small quantity of steam is being allowed to enter the chest.

The inventor states that if the carbonic acid gas is turned on into the steam chest together with a full head of steam it will expand and assist the steam in driving the engine. This help is desirable when climbing steep grades, obtaining high speed on level roads or on any other occasion when it is wished to increase the normal efficiency of the steam engine. Also the carbonic acid may be used to drive the engine slowly when a normal steam pressure has not yet been attained or at any other time, by simply turning into the steam chest with it enough steam to warm the chest to a point sufficient to cause expansion of the carbonic acid gas.

Mr. Gibson's assisted steam engine is at least novel. Working tests will be necessary, however, to establish the practical efficiency of the scheme.

Although in most details the invention is carefully worked out, one particular is humorously crude, yet no more so, perhaps, than many constructional details of commercial motor-vehicles of the present time. In order to adjust the chain which forms driving connection between the engine shaft and the rear wheel differential gear, the entire engine, boiler, gasolene tank and water reservoir, together with all of their appurtenances must be moved backward or forward on the vehicle frame. Suitable fastenings in order to allow such movement of the parts named are provided. A chain adjustment is such a simple problem in lieu of the long experience of the bicycle makers in this line that it seems odd that motor-vehicle designers would deem it necessary to adopt as cumbersome a method of accomplishing the desired result as that chosen by Mr. Gibson. The point brings out the lesson that even those who carefully studied the development of the automobile will slip up now and then on some detail in design.

PROPOSED RACING ORGANIZATION

New York, Sept. 1.—A sensational morning sporting paper publishes a long story to-day that William K. Vanderbilt, Jr., is to organize an association for motor vehicle race promoting to be known as the Automobile Racing Club.

The story goes on to say that Mr. Vanderbilt will be president, William G. Rockefeller, Jr., vice-president, and A. C. Bostwick secretary and treasurer. The incorporators will be the men already mentioned, together with John R. Livermore, W. J. Max-Muller, Harold Vanderbilt, Knight Neftel and George I. Scott.

The club will apply for a charter, continues the story, in this state and will rent one of the tracks near New York for the first series of races. Both Morris Park and the Empire City trotting track are well suited to automobile racing, and it is probable that the choice will fall on one of them.

Owners as Motormen

According to the present plan there will be at least one race a day during the series, in which the owners themselves will be obliged to handle their machines. It is argued that this feature will do much toward popularizing the sport, for thousands of persons who now care noth-

ing for racing in general, would pay to see millionaires speeding it at a mile a minute in a struggle for supremacy.

Most of the contests between automobiles will, of necessity, be handicap affairs, but the feat of picking winners will not be easy. Motor carriages have not yet reached a state of perfection, and under high pressure are about as uncertain as horses.

Bookmakers will be invited to do business at the automobile races, for the projectors of the scheme fully realize that without betting the races would lose half their interest.

At present there are comparatively few racing automobiles in this country. The electrical machines owned by W. K. Vanderbilt, Jr., and A. C. Bostwick are acknowledged to be the fastest.

Club Will be a Strong One

The element of speed in automobiles is receiving more attention than formerly, however, and it is only a question of a short time before at least a hundred regular racing machines will be in use. Some of these are being built in this country, while others have been ordered in Paris and London.

W. K. Vanderbilt estimates that at least 200 men will join the Automobile Racing Club when the membership list is thrown open. These will be men of wealth, to whom the initiation fee of $5,000 will be but a trifling matter.

The proposed incorporators of the club are convinced that, viewing membership solely in the light of an investment, many men will join who will do little or no racing on their own account. They claim that but little work is necessary to make such a club a paying proposition in a community as liberal in its patronage of sport as is that of New York.

A Feasible Plan

The plan is an excellent and entirely feasible one, though the Motor Age correspondent cannot confirm it by reason of all the parties interested being out of town for the Labor Day holiday. Morris Park and the Empire City trotting track are both mile courses well adapted for motor vehicle racing even by the largest cars. The men said to be interested in the new club have influence and money enough to secure these courses. The Vanderbilts are also large owners in the Coney Island mile track. There is also available the old mile circuit at Guttenburg, where the Great Tri-State fair automobile races are to be held.

WILL HELP WATCH JOCKEYS

A St. Louis press dispatch says it is proposed by the projectors of the Kinlock Park race course to build an elevated railway track around the circuit near the inner rail for the purpose of running a patrol judge's motor vehicle to keep pace with the flying steeds. It is expected that trestle work and track will cost about $5,000. Under this plan the judge could keep his eye on the jockeys and horses all the way round. At present he is stationed at the head of the stretch, and can see what the boys are doing only when they round the turn into the home run. After that he makes no pretense of observing them, as the clouds of dust usually obscure his vision. If the present plans carry, truer racing would likely result. The track opened September 1, and is hoped to have the arrangement completed before the coming season closes.

NEWPORT RACES

Newport, R. I., Sept. 1.—Everything points to the success of the automobile meet at Aqueduct Park next Thursday. The meet was promoted largely through the efforts of William K. Vanderbilt, Jr., whose speedy German Daimler has won him such fame as a record maker on the road.

There will be races for each of the four classes of carriages and for motor tricycles. There will be a wind up contest for all classes of cars. The distance in each race will be five miles and each vehicle will be required to carry its full seating capacity.

Enough entries have already been received to insure good fields in each class. William K. Vanderbilt, Jr., has entered his German Daimler and also his locomobile. George Isham Scott will also race his locomobile. Max-Muller and Knight Neftel, of Boston, have also made entries.

Harold Vanderbilt will ride in the tricycle race.

Trophies have been given by W. K. Vanderbilt, Jr., Mrs. Herman Oelrichs, Mrs. O. H. P. Belmont, the Locomobile Company of America and the New England Electric Vehicle & Transportation Co. There will be a first prize for each class race and a first and second prize for the final mixed race.

PACED CYCLE RECORDS

The use of motocycle pace in bicycle races has reduced the records very materially within the past few years. An idea of the speed that may be obtained behind motor tandems—the only style of pace in vogue on American bicycle tracks—can be gained from the following authentic table of American paced bicycle records:

Distance.	Time.	Holder.
1 mile	1:41 2-5	Taylor
2 miles	3:16 1-5	McFarland
3 miles	4:48 1-5	Nelson
4 miles	6:20 3-5	Nelson
5 miles	7:53	Nelson
6 miles	9:25 4-5	Nelson
7 miles	10:58 2-5	Nelson
8 miles	12:31	Nelson
9 miles	14:04 4-5	Nelson
10 miles	15:37 2-5	Nelson
11 miles	17:09 4-5	Nelson
12 miles	18:40 1-5	Nelson
13 miles	20:10 4-5	Nelson
14 miles	21:44 4-5	Nelson
15 miles	23:27 3-5	Nelson
16 miles	25:03 2-5	Nelson
17 miles	26:38 2-5	Nelson
18 miles	28:16 3-5	Nelson
19 miles	29:54 4-5	Nelson
20 miles	31:29	Michael
21 miles	33:02	Michael
22 miles	34:39 2-5	Michael
23 miles	36:15 2-5	Michael
24 miles	37:52 3-5	Michael
25 miles	39:29	Michael

AN AUTOMOBILE ROAD RACE

Reading, Pa., Sept. 3.—Among the sporting features of labor day here was an automobile race from Reading to Lebanon and return, a distance of about fifty-six miles. Of the eight entries for the event but four started, accidents to the machines preventing the participation of the others. The starters were Irvin D. Lengel, Gustavus A. Boyer, Harry O. Keller and Edward S. Youse, all of this city. They were sent away from the Mansion House here in the order named at five-minute intervals. Youse was the winner in the fast time of 2:00:15, Keller was second in 3:02:00, and Boyer third in 3:06:00. Lengel's vehicle was disabled on the outward trip after going but six miles.

The promoter of the event, John M. Archer, was prevented from starting by a peculiar mishap. While backing his machine, just previous to the start, he ran into a colored wheelman named George Ward. Archer jumped off to help the boy, whose wheel was smashed, and while disentangling him from the wreck the "auto" started ahead at a lively pace, doing a "guideless wonder stunt." It made a bee line for a large crowd on the sidewalk, and had not George Weidenheimer grasped the tiller and shunted the runaway off it would have mounted the curb and done direful things to the plate-glass bulk window for which it was heading. The only grievous result, apart from throwing the machine out of the race, was the smashing of a wheelbarrow full of glass jars standing at the curb.

MOTOCYCLE RECORDS BROKEN

Philadelphia, Sept. 1.—Not only did Jimmy Michael set a new record of 39:29 in his twenty-five mile victory over Johnny Nelson at Woodside Park to-day; but a most remarkable world's record for motor tandems was set by Crooks and Sherrer in the five-mile race. These are the figures:

Distance.	Time per Mile.	Total Time.
1 mile	1:19 4-5	1:19 4-5
2 miles	1:18 1-5	2:38
3 miles	1:20 3-5	3:58 3-5
4 miles	1:22	4:20 3-5
5 miles	1:28 3-5	6:49 1-5

The former world's record was 7:08 1-5.

BOSTWICK AND HIS RACING MACHINE

A photograph of the American chauffeur, Albert C. Bostwick, as he appeared on his famous, record-holding De Knyff racing machine, just after passing the tape at Perigeneux in the great Bordeaux-Perigeneux-Bordeaux road race, having covered 116 kilometers (seventy-two miles) in 1 hour and 31 minutes. His mechanicien, who can be seen sitting on the floor of the car on the right of the picture, is Henry Fournier, well known in this country as one of the first to introduce motor pacing in bicycle races.

NEWS OF THE MOTOR INDUSTRY

CHICAGO INTER OCEAN TOURNAMENT

The Chicago Inter Ocean has already fairly covered the bill boards and blank walls of the Windy City with a profusion of posters, large and small, advertising its tournament of September 18 to 22, while the country papers of the middle states are filled with reading notices concerning the exhibit and contests. The promoters are certainly showing an appreciation of the value of good advertising and if there be any failure of the public at large to attend, it will not be for want of being fully advised of the nature of the excellent programs which will be offered for its delectation. But there is no reason to doubt that the public will attend in crowds that will tax the capacity of the enormous stands and grounds. The more than liberal advertising which is being done on behalf of the tournament will be appreciated by those who have contracted for exhibition space, for, no matter how good the programs might be, they would be of little value, from a commercial standpoint, if the public were not present in force to witness them.

TRENTON EXHIBIT BOOMING

New York, Sept. 3.—E. E. Schwarzkopf, in charge of the automobile exposition in connection with the Greater State Fair at Trenton, N. J., September 24 and 25, is a busy man these days at his New York headquarters, in the Astor Court Building.

All the floor space originally assigned to the automobile exposition department of the fair, comprising 25,000 square feet, has been taken, and the erection of an annex for the purpose is in contemplation.

George F. Chamberlain, acting president of the Automobile Club of America, has accepted, on behalf of his club, the cup which the fair association tendered the club, to organize a road-run from New York to Trenton, on September 22, the winner of the run to be presented with the cup. The committee on runs and tours is now organizing the run.

It is contemplated that racing machines will give time allowance to the other automobiles entered in the run. To the program of the automobile races, to take place Sept. 24 on the half-mile track, has been added a motor-tricycle race of ten miles. In this will be awarded a first prize of $75.00, plate or cash; a second prize of $25.00 cash; and a third prize of $5.00 cash. All prizes will be awarded if competed for by five or more participants. If only three competitors start, first prize only will be awarded.

The time originally set for the closing of entries has been extended to September 20.

EXPOSITION AWARDS

Paris, Aug. 25.—The report of the judges in the transportation class, including carriages, bicycles and automobiles has been made public. The Columbia & Electric Vehicle Co. secured the highest award to any American motor-vehicle, although gold medals were secured by the Locomobile Co. of America, the Riker Electric Vehicle Co. and the American Electric Vehicle Co., and silver medals by the Columbia & Electric Vehicle Co:, the Electric Vehicle Co. and the Riker Electric Vehicle Co.

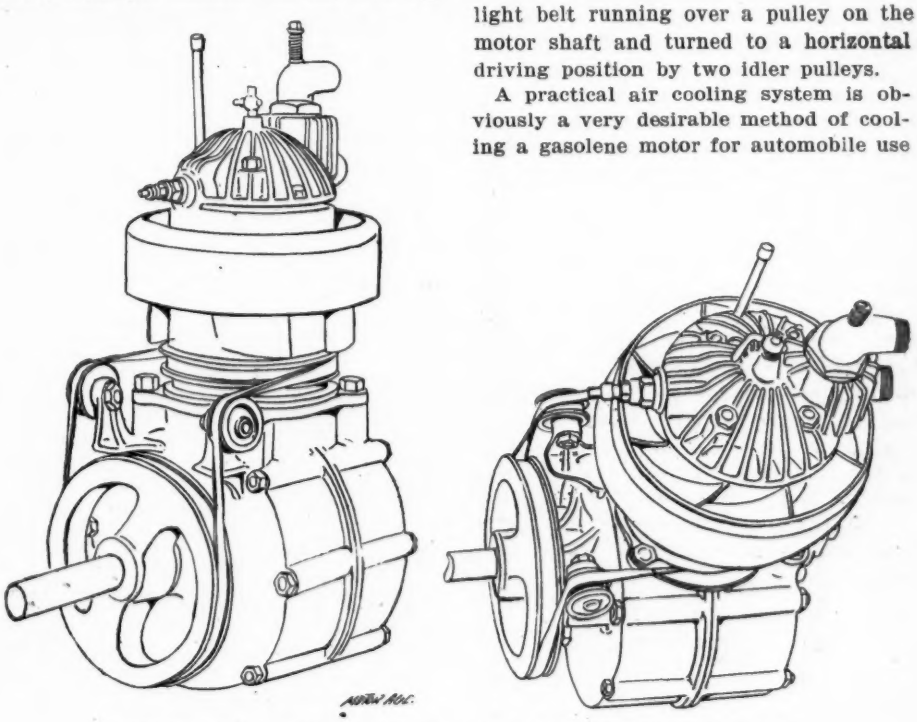
CLAIMS GREAT IMPROVEMENTS

Cleveland, Sept. 3.—Martin Mulhauser of this city has obtained patents on a gasolene motor for motor vehicles which he claims will compel other manufacturers to make radical changes in their machines if they want to keep abreast of him. He has been experimenting for ten years, and he now claims that he has a motor that will do away with all odor and vibration and that can be controlled as readily and as accurately as that of an electric vehicle. He has secured a contract to build an automobile

ambulance for McGorry Bros., leading undertakers of this city.

THE KAINZ AIR-COOLED MOTOR

Among the several recently introduced German explosive motors the Kainz, which is shown in the accompanying illustration is the most notable. It is a single cylinder vertical motor, operates on the four-cycle plan and makes 1,860 revolutions per minute. In size it is 3¾ by 3¾ inches and develops 4½ horsepower. The ignition is by electric spark.



KAINZ MOTOR ROTARY VENTILATORS FOR COOLING CYLINDER.

The most distinctive feature of the Kainz motor is the method employed to cool the cylinder by air currents. The makers of this motor realizing that a vehicle motor cannot always be kept in a natural draft, such as that to which the motor of a racing motocycle is subjected when the machine is in motion, have devised a scheme for forced draught which will be always in effect while the motor is running regardless of whether or not the vehicle to which it is attached be in motion. The desirability of an effective forced draught is also manifest when slowly starting a vehicle or when laboriously climbing steep hills.

The cylinder of the Kainz motor is surrounded by two systems of fan ventilators, one above the other. The lower one receives fresh air and whirls a strong current around the cylinder wall and upward against the cylinder head. The ventilating fans are made of aluminum, run on ball bearings and are driven by a light belt running over a pulley on the motor shaft and turned to a horizontal driving position by two idler pulleys.

A practical air cooling system is obviously a very desirable method of cooling a gasolene motor for automobile use and it is probable that the few attempts which have been made to contrive suitable forced draught apparatus, of which the Kainz motor is one, will be supplemented by rapidly increasing experiment and practice in this line.

ASK A CORRECTION

Messrs. Edmund E. Allyne and Le Dru R. Pomeroy ask a correction in regard to the statement in The Motor Age to the effect that the Van Wagoner & William Hardware Co. of Cleveland, were inter-

ested in the development of patent No. 655,749, issued to the two gentlemen. They say that they are merely employees of the company and that the latter has no interest in the development of the patent and no thought of engaging in the motor-vehicle business.

FINE MALLEABLE CASTINGS

In manufactures of all kinds the first and essential factor should be quality; and with this maintained there is no question as to the success of any concern. For a number of years malleable iron castings have been in use and the field has gradually broadened until today they are used, more or less, in almost every branch of the iron or machine line. In many cases a rough casting little stronger than cast iron will answer, but there are large users who need a fine smooth and a strong casting.

Attention has recently been called to the work being done by the Acme Steel and Malleable Iron Works of Buffalo, N. Y., which shows to what perfection the malleable iron business can be brought by careful selection of stock and proper attention to details of the manufacture. There is probably no concern who has a higher reputation for first-class work of this character than these people.

By the use of only the best grade of charcoal pig iron with mixtures prepared by chemical analysis they are able to supply a metal of uniform quality, close grained, with fine machining qualities and susceptible of receiving a high polish. The average tensile strength of this metal, according to the company, is over 50,000 pounds to the square inch, and it has been adopted by a number of automobile and other manufacturers in the place of forgings, with very gratifying and successful results.

In addition the Acme people produce two grades of steel metal, recommending their ductile steel for such parts as require an extra amount of bending, or to which it is desired to braze tubing. Their Acme steel is designed for a high grade of work and for parts requiring tempering after finishing. It is used largely for hatchets, axes, hammers and engine and machine parts, especially cranks, connecting rods, gears, etc. A razor made in this metal is before the writer and shows conclusively the perfection of their output when an instrument of this character can be furnished that will puzzle and expert to tell it from a forged one. It will be well for all those wanting fine, strong work to put themselves in communication with the Acme people.

CARLEY A FUGATIVE

New York, Sept. 1.—Frank D. Carley, the main promotor of the Anglo-American Rapid Vehicle Co., is among the missing, and it is assumed that the rapid vehicle company bubble has burst with his departure.

Motor Age, from the start, knowing the record of Pennington, who was mixed up in the deal, refused to put any credence in the scheme or publish any further of its wild press notices after its setting forth of Pennington's record and its first report of the Motor Age man's interview with Carley, which was printed verbatim that its readers might best judge for themselves the utterly wind-founded character of the whole stock jobbing scheme.

A blatant and bluffing competitor swallowed the whole story, bob, hook and sinker; and for weeks mingled in its columns the company's torpedo car and mile a minute speed trial fakes with its repeated stories of $150 motor tricycles that were soon to be built.

The bubble has now burst and Motor Age is very well satisfied to have been "beaten" so constantly in news of this character. In view of the outcome of the whole stock jobbing fake Motor Age can well afford to laugh long because it can laugh last at its competitor's frequent "crows" for "news beats" of the Pennington rapid vehicle and the $150 motor tricycle variety.

THE STEARNS AUTOMOBILE CO.

The Stearns Automobile Co. of Philadelphia has been incorporated with an authorized capital stock of $1,000,000. This concern is the outgrowth, evidently, of the Anglo-American Rapid Vehicle Co.,

in which there has been internal dissension recently, resulting in the enforced withdrawal of Pennington, Lawson and others, and the election of E. C. Stearns of Syracuse to the post of manager. In this connection the following from the New York Sun, in reference to Promoter-Broker Carley, who was high in the councils of the Anglo-American company, is interesting:

"In a suit brought by E. Martin Black against Francis D. Carley and others, regarding an alleged trust fund, Justice McAdam of the Supreme court made an order August 30 for substituted service of the summons on Carley. An affidavit of John Leelan, clerk in the office of Robert L. Stanton, attorney for Black, stated that he had tried in vain at the residence of Carley, 120 East Thirty-fourth Street, at his office at 20 Broad Street, and at several brokerage offices which Carley was in the habit of visiting to find any trace of Carley. Carley has been active in Wall Street for several years."

SHELBY PLANT TO OPEN

Cleveland, Sept. 3.—The plant of the Shelby Steel Tube Co. at Ellwood City, Pa., formerly owned by H. A. Lozier, and which has been closed almost continuously since it went into the combination, is to resume operations next week.

MARLBORO STEAM VEHICLES

The Marlboro Automobile and Carriage Co. of Marlboro, Mass., has issued an attractive, comprehensive catalogue of their steam vehicles, steam engines, steam boilers and running gears.

MOTOR-VEHICLES IN BUENOS AYRES

In response to inquiries, William N. Lord, consul at Buenos Ayres, writes:

In Buenos Ayres there are about twelve automobiles of all descriptions.

The motive power is steam, electricity and petroleum direct explosion. The motive power most in vogue is the petroleum direct explosion.

There are three machines propelled by steam manufactured by the Locomobile Co. of America; one French machine manufactured by the Woods Electric Vehicle Co.; one phaeton made by the Fabrica Italiana de Automoviles of Torino, Italy; one electric delivery wagon of American manufacture. There are about half a dozen motocycles of various description, mostly manufactured in France on the Dion-Bouton system.

The duty is 50 percent, plus 5 percent plus 2 percent on the invoiced or appraised valuation.

THE OVERMAN AUTOMOBILE CO.

The Overman Automobile Co. of 81 Fulton Street, New York City, has issued a neatly printed folder descriptive of their steam carriage, of the mechanical features of which an extended account was given in the patent department of The Motor Age a few weeks ago. A large number of automatic safety devices is the leading feature of the vehicle.

VEEDER ODOMETERS

The Veeder Mfg. Co. of Hartford, Conn., has issued a small pamphlet illustrating their odometers, or distance-recording instruments. These instruments are accurate and neatly made for wheels of varying sizes from twenty-four inches in diameter to fifty inches, by jumps of only two inches to the wheel.

CENTLIVRE JOINS THOMAS

The E. R. Thomas Motor Co. of Buffalo, N. Y., have absorbed the motor cycle and gas engine business of the L. A. Centlivre Mfg. Co. of Fort Wayne, Ind. Mr. Louis Ohnhaus, manager of the latter firm, will take charge of the sales department of the E. R. Thomas Co., which manufactures the Autocrat motor bicycle and tricycle, vehicles and gas engines, also job all parts connected with motor vehicles.

TO MAKE MOTOCYCLES

The Hendee Mfg. Co. of Springfield, Mass., is preparing, according to newspaper reports, to engage in the manufacture of motocycles. The Hendee company has been engaged in the bicycle business for a number of years past, and

has a small but well-equipped factory with about 14,000 square feet of floor space.

RIDGWAY ON THE ROAD

C. G. Ridgway, who severed his connection with the Anglo-American Rapid Vehicle Co., some time ago, to take a position with the De Dion-Bouton Motorette Co. of Brooklyn, is now on a tour with one of the company's motorettes and motocycles in western New York, visiting the automobile and carriage trades. Manufacturers who desire to see him may have the opportunity by communicating with the company by letter or telegraph at Church Lane and Thirty-seventh street, Brooklyn.

TRADE NOTES

The Philadelphia Motor Vehicle Co. has filed articles of incorporation, with an authorized capital of $50,000.

The Maryland Automobile Mfg. Co. of Cumberland, Md., has been incorporated with a capital stock of $10,000. J. Philip Roman is president.

H. W. Edaburn, a cycle dealer at Creston, Ia., has arranged to work on an automobile during the coming winter.

Fred Ward & Son of Sacramento, Cal., agents for the Riker company, report a number of orders for electric vehicles.

The Indiana Liquid Air, Power and Automobile Co. has been incorporated by Indianapolis men, with an authorized capital of $500,000.

T. H. Bolte of Kearney, Neb., a man who was one of the earliest designers of safety bicycles, is now engaged in the manufacture of an automobile.

ROYALTY IN TROUBLE

Prince Jaime de Bourbon of the royal family of France, a son of the pretender to the throne of Spain and a lieutenant in one of the most fashionable Polish

regiments—if so international a combination can be comprehended—motored to the Paris exhibition and naturally had to pass through Germany. The prince traveled incognito as Comte de Viracheau and was accompanied by a friend. While passing by Cuestrin the prince had an unpleasant adventure, for he knocked down a herder in the employ of a landed proprietor at Tzschernow and injured the lad quite severely. He did not waste much time in getting to Cuestrin, where he deemed himself safe. But the boy's master was just as speedy as the prince and followed him to Cuestrin, where he easily traced his whereabouts and accused him of having run over the lad.

The prince, who had to call on an interpreter to make himself understood, acknowledged his guilt and after a great deal of talking offered to pay the farmer forty marks, about $10, for the damage inflicted by him on the boy. Both parties being agreed the prince handed over the money and the farmer withdrew from the princely presence satisfied.

MISCELLANEOUS

Advertisements under this head 5 cents per word, cash with order. Express orders, post office orders, or postage stamps accepted.

FOR SALE

FOR SALE—Winton automobile, 1899 pattern; newly renovated; looks as good as new. Address P. O. Box 548, Philadelphia, Pa. *

FOR SALE—1900 Winton Special; all latest improvements; nearly new; splendid condition. Address E. M. R., 807 N. 24th St., Philadelphia, Pa. *

FOR SALE—The Automobile Storage and Repair Co., 57 West 66th St., New York, have new and second-hand steam, gasolene, and electric carriages constantly on hand and have always some special bargains. *

40 AUTOMOBILES FOR SALE.

Immediate delivery. Twenty-five are new and of LATEST MODELS. Others are slightly used but in first-class order. Different makes. We can save you money in buying any kind of an automobile. Send for descriptive list and full particulars. References given.

AUTOMOBILE HEADQUARTERS,
33 Stanhope Street, - - BOSTON, MASS.

ACETYLENE

AUTOMOBILE SEARCH LIGHT

1,000 Candle Power.

SIMPLE, RELIABLE and SAFE

Reflector attached to Steering Gear. Water Tank carried under Seat. **AUTOMATIC in OPERATION. COST** to operate, 1 cent for 2 hours.

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Carse Bros. Co. 64 and 66 Wabash Ave. Chicago, Ill.

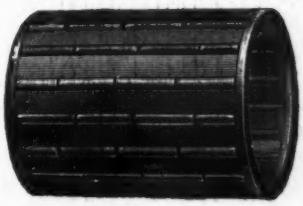
CREST MANUFACTURING CO.
CAMBRIDGEPORT, MASS.

CREST GASOLINE MOTORS FOR TRICYCLES AND AUTOMOBILES.

The LIGHTEST and CHEAPEST Motor Per Horse-Power Made in the World.

FOR MOTOR VEHICLES

GET OUR CAT.



IT TELLS ALL.

THE BALL BEARING CO.
BOSTON, MASS.

ATLANTIC TUBE CO.

WELDLESS STEEL TUBING FOR AUTOMOBILES

CHICAGO PITTSBURGH NEW YORK